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10/620,814	07/17/2003	Subramaniam Radhakrishnan	4062-81	8987

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EXAMINER	
WONG, EDNA	
ART UNIT	**PAPER NUMBER**
1753	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/620,814	RADHAKRISHNAN ET AL.	
	Examiner	Art Unit	
	Edna Wong	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-13 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-13 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Objections

Claims **1 and 12** are objected to because of the following informalities:

Claim 1

line 3, the word -- and -- should be inserted after the word "layer," (first occurrence).

Claim 12

line 2, the word "anisidene" should be amended to the word -- anisidine --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims **7, 9-11 and 13** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7

line 1, "the insulating polymer solution" lacks antecedent basis.

Claim 9

line 1, "the conducting polymer coated substrate" lacks antecedent basis.

lines 1-2, it is unclear what is meant by the words "the conducting polymer coated substrate is substrate".

line 2, "the polymer deposition" lacks antecedent basis.

Claim 10

line 2, the phrase "such as copper chloride, ferric chloride, cobalt chloride and like Lewis acid compounds" is indefinite.

lines 2-3, the words "like Lewis acid compounds" are indefinite.

lines 3-4, the phrase "preferably 0.006 M to 0.012 M" is indefinite.

Claim 11

lines 1-2, "the monomer used for depositing conducting polymer film" lacks antecedent basis.

Claim 13

line 1, "the conducting polymer" lacks antecedent basis.

lines 1-2, "the metal pre-coated insulating substrate" lacks antecedent basis.

lines 2-3, "the pre-treated insulating substrate" lacks antecedent basis.

line 4, the phrase "such as hydrochloric or sulfuric acid" is indefinite.

line 4, it appears that "a monomer" is the same as that recited in claim 1, line 4. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1-4, 6 and 11-12** are rejected under 35 U.S.C. 102(b) as being anticipated by **Tamamura et al.** (US Patent No. 4,559,112).

Tamamura teaches a process for the preparation of a conducting electrode useful for the electrocatalytic oxidation of alcohols which comprises:

(a) coating a substrate **12** with a metallic or conducting backing layer **13** (col. 6, lines 5-18); and

(b) electrochemically coating the metal coated or conductive backing layer coated substrate with a polymer using a monomer (col. 5, lines 35-46) *or* a mixture of

monomer and an activating agent to obtain the conducting electrode (Fig. 1).

The substrate comprises an insulating polymer **14** coated substrate (col. 4, line 67 to col. 5, line 24).

The substrate is selected from the group consisting of a glass plate (col. 11, Table 1), polyester film having smooth surface and an electrical resistivity of greater than 10^{10} ohm-cm.

The metallic backing layer comprises of a vacuum deposited (= sputtering) thin film of a metal selected from the group consisting of gold, platinum and chromium (col. 6, lines 5-7).

The insulating polymer is selected from the group consisting of polyvinyl butyral, polyvinyl acetate and styrene butadiene co-polymer (= polyvinyl acetate) [col. 5, line 18], having adhesion strength higher than 10 g/micron (*inherent*).

The monomer used for depositing conducting polymer film is selected from the group consisting of aromatic and heterocyclic compounds containing nitrogen (col. 5, lines 35-46).

The monomer is selected from the group consisting of aniline, pyrrole, anisidene and toluediene (col. 5, lines 35-46).

Since Tamamura teaches all of the limitations recited in the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

I. Claims **5 and 8-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Tamamura et al.** (US Patent No. 4,559,112) as applied to claims 1-4, 6 and 11-12 above, and further in view of **Nakama et al.** (US Patent No. 5,126,017).

Tamamura is as applied above and incorporated herein.

The method of Tamamura differs from the instant invention because Tamamura does not disclose the following:

a. Wherein the conducting backing layer is selected from dip-coated carbon and graphite dispersions having inert nature in the potential range of 0 to 1.0 Volts with respect to saturated calomel electrode (SCE), as recited in claim 5.

b. Wherein the activating agent is selected from the group consisting of halides of multivalent metals with electronegativity in the range of 1.2 to 1.5, as recited in claim 8.

c. Wherein the conducting polymer coated substrate is subjected to doping with a doping agent when the polymer deposition is carried out only with the monomer, as recited in claim 9.

d. Wherein the doping agent contains electron acceptor compounds such as

copper chloride, ferric chloride, cobalt chloride and like Lewis acid compounds and is used in a concentration in the range of 0.001 M to 0.1 M preferably 0.006 M to 0.012 M, as recited in claim 10.

Regarding claim 5, Tamamura teaches that the electrochemical polymerization substrate comprises a material obtained by depositing one of the materials (a noble metal such as gold, platinum and palladium) on a proper substrate (= glass) [col. 11, Table 1] by evaporation, sputtering, CVD, plating or coating (col. 6, lines 5-18).

Like Tamamura, Nakama teaches a method of preparing a conducting aromatic polymer compound by electrochemical polymerization. Nakama teaches that the material of the working electrode used may be any of the electrode materials used in ordinary electrolytic polymerization. Examples thereof include platinum, gold, stainless steel, nickel, carbon, conductive glasses obtained by vapor deposition of iridium/tin oxide on the surfaces of glasses, and the like (col. 5, lines 3-22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Tamamura with wherein the conducting backing layer is selected from dip-coated carbon and graphite dispersions because substituting the gold, platinum and palladium materials disclosed by Tamamura with carbon would have been functionally equivalent as taught by JP '423 (abstract).

It has been held that the selection of a known material based on its suitability for

its intended use supports a prima facie obviousness determination. See MPEP § 2144.06 and § 2144.07.

As to having an inert nature in the potential range of 0 to 1.0 Volts with respect to saturated calomel electrode (SCE), this would have been inherent in carbon. A newly discovered property does not necessarily mean the product is unobvious, since this property may be inherent in the prior art. *In re Best* 195 USPQ 430; *In re Swinehart* 169 USPQ 226.

Regarding claim 8, Tamamura teaches that an *electrolyte* for electrochemical polymerization comprises any compound such as organic quaternary ammonium salts, inorganic salts, or strong acids of protone acid (col. 5, lines 60-63).

Like Tamamura, Nakama teaches a method of preparing a conducting aromatic polymer compound by electrochemical polymerization. Nakama teaches that in the production of an electrically conductive polymer film by electrolytic polymerization, a fluorocarbon surfactant is added to the polymerization solution comprising a combination of monomer/electrolyte/solvent (col. 3, lines 52-56). The *electrolyte* used can be incorporated as a dopant (which provides electroconductivity to the polymer) into the electrically conductive polymer to be formed. The electrolyte includes $LiBF_4$, HBF_4, BF_3, PF_3, AsF_6, HNO_3, H_2SO_4, $HclO_4$, HCl, $FeCl_3$, $MOCl_5$, 7,7,8,8-tetracyanoquinodimethane (TCNQ) complexes, alkylsulfonates, alkylbenzenesulfonates, phthalocyanines, porphyrins and the like (col. 4, lines 26-38).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Tamamura with wherein the activating agent is selected from the group consisting of halides of multivalent metals with electronegativity in the range of 1.2 to 1.5 because this would have been inherent in the electrolyte used, e.g., in $FeCl_3$.

Regarding claims 9 and 10, Tamamura teaches that an *electrolyte* for electrochemical polymerization comprises any compound such as organic quaternary ammonium salts, inorganic salts, or strong acids of protone acid (col. 5, lines 60-63).

Like Tamamura, Nakama teaches a method of preparing a conducting aromatic polymer compound by electrochemical polymerization. Nakama teaches that in the production of an electrically conductive polymer film by electrolytic polymerization, a fluorocarbon surfactant is added to the polymerization solution comprising a combination of monomer/electrolyte/solvent (col. 3, lines 52-56). The *electrolyte* used can be incorporated as a dopant (which provides electroconductivity to the polymer) into the electrically conductive polymer to be formed. The electrolyte includes $LiBF_4$, HBF_4, BF_3, PF_3, AsF_6, HNO_3, H_2SO_4, $HclO_4$, HCl, $FeCl_3$, $MOCl_5$, 7,7,8,8-tetracyanoquinodimethane (TCNQ) complexes, alkylsulfonates, alkylbenzenesulfonates, phthalocyanines, porphyrins and the like (col. 4, lines 26-38).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Tamamura with wherein

the conducting polymer coated substrate is subjected to doping with a doping agent when the polymer deposition is carried out only with the monomer because a dopant would have provided electroconductivity to the polymer as taught by Nakama (col. 4, lines 26-38).

As to wherein the doping agent contains electron acceptor compounds such as copper chloride, ferric chloride, cobalt chloride and like Lewis acid compounds, Nakama teaches $FeCl_3$ (col. 4, lines 26-38).

As to used in a concentration in the range of 0.001 M to 0.1 M preferably 0.006 M to 0.012 M, Nakama teaches that the electrolyte concentration is from 0.01 to 5 mol/l (col. 4, lines 57-59 and col. 4, line 64 to col. 5, line 2).

II. Claim **7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Tamamura et al.** (US Patent No. 4,559,112) as applied to claims 1-4, 6 and 11-12 above.

Tamamura is as applied above and incorporated herein.

The method of Tamamura differs from the instant invention because Tamamura does not disclose wherein the insulating polymer solution is used in a concentration in the range of 1 to 2 wt./v, as recited in claim 7.

Tamamura teaches spin-coating or casting the thermoplastic resin films onto corresponding Nesa glass substrates to a thickness of 1 micron (col. 14, Examples 18-58; and Table 3).

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the insulating polymer solution used for the spin-coating or casting inherently has a concentration. Although, not disclosed by Tamamura, the concentration is a result-effective variable and one skilled in the art has the skill to calculate the concentration that would determine the success of the desired reaction to occur, e.g., depending upon kind, film thickness and properties of the film (such as mechanical strength, modulus elasticity, electric conductivity and diffusion of the monomer into the insulating polymer film), absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

Furthermore, changes in concentration is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Boesch.* 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and MPEP § 2144.05(b).

III. Claims **13** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Tamamura et al. (US Patent No. 4,559,112) as applied to claims 1-4, 6 and 11-12 above, and further in view of **JP 2-18423** ('424).

Tamamura is as applied above and incorporated herein.

The method of Tamamura differs from the instant invention because Tamamura does not disclose wherein the coating of the conducting polymer on the metal pre-coated insulating substrate is carried out by dipping the pre-treated insulating substrate in an aqueous electrolyte containing 0.1 to 0.5 M hydrogen containing mineral acid such hydrochloric or sulfuric acid together with a monomer and a macrocyclic compound, by applying a potential of 0.7 to 0.9 Volts, as recited in claim 13.

Tamamura teaches that an acetonitrile solvent is normally used. However, any solvent can be used when the solvent allows the aromatic compound to perform electrochemical polymerization and dissolves a proper electrolyte (col. 5, line 63 to col. 6, line 4).

Like Tamamura, JP '423 teaches a method of preparing a conducting aromatic polymer compound by electrochemical polymerization. JP '423 teaches dissolving aniline or its derivative and a salt of $LiBF_4$ in an organic solvent (e.g., acetonitrile) ***or*** dissolving aniline or its derivative in water together with an acid (e.g., HBF_4, $HCLO_4$, HCl or H_2SO_4) [abstract].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Tamamura with wherein the coating of the conducting polymer on the metal pre-coated insulating substrate is

carried out by dipping the pre-treated insulating substrate in an aqueous electrolyte containing 0.1 to 0.5 M hydrogen containing mineral acid such hydrochloric or sulfuric acid together with a monomer because substituting the acetonitrile solvent disclosed by Tamamura with an aqueous electrolyte containing 0.1 to 0.5 M hydrogen containing mineral acid such hydrochloric or sulfuric acid would have been functionally equivalent as taught by JP '423 (abstract).

As to a macrocyclic compound, Tamamura teaches that the electrically conducting polymer solution must have the proper composition adjusted for the type of insulating polymer film used (col. 5, lines 47-59). This compound could be a surfactant compound or a co-polymer. The Examiner sees no criticality in having a macrocyclic compound in the aqueous electrolyte. The Examiner also sees no significance in how this would have contributed to the art. Furthermore, Applicants' specification does not disclose what these compounds specifically are, and what purpose they serve.

As to applying a potential of 0.7 to 0.9 Volts, Nakama teaches a voltage of from 0.5 to 2 volts (col. 5, lines 29-46).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edna Wong
Primary Examiner
Art Unit 1753

EW
August 26, 2005